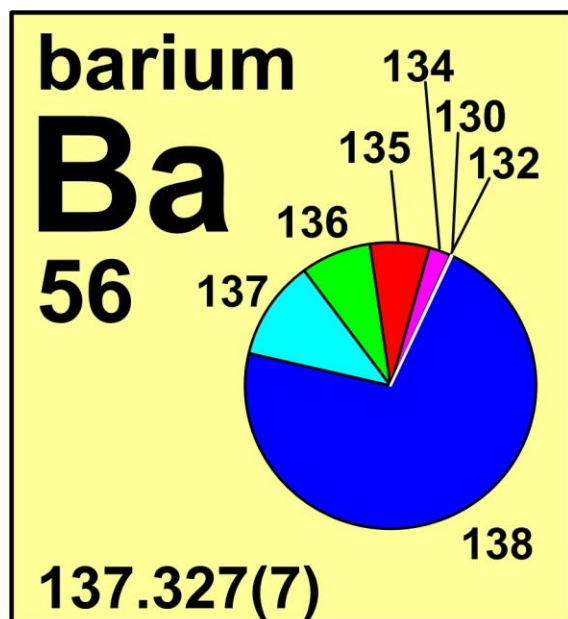


barium

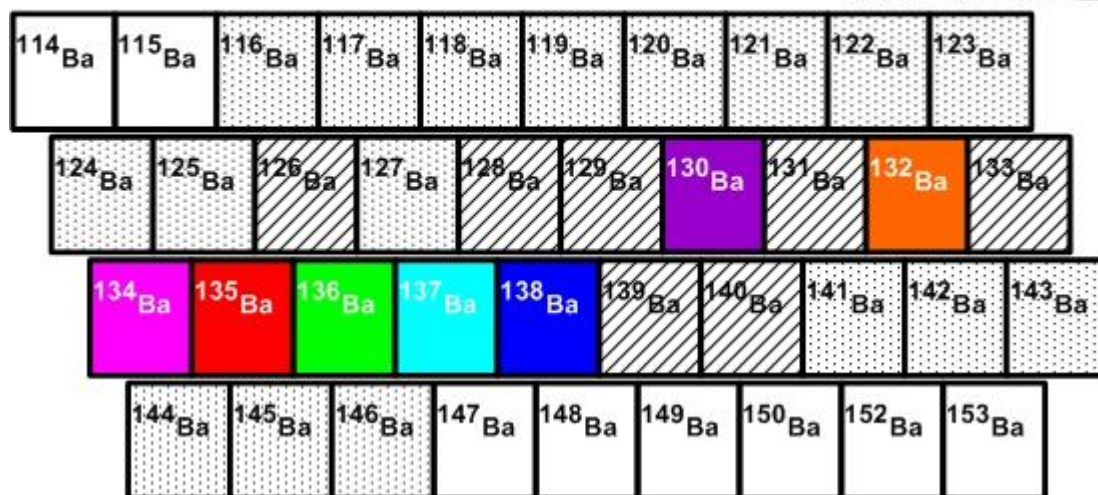


Stable isotope	Atomic mass*	Mole fraction
¹³⁰ Ba	129.906 3208	0.001 06
¹³² Ba	131.905 0613	0.001 01
¹³⁴ Ba	133.904 5084	0.024 17
¹³⁵ Ba	134.905 6886	0.065 92
¹³⁶ Ba	135.904 5759	0.078 54
¹³⁷ Ba	136.905 8274	0.112 32
¹³⁸ Ba	137.905 2472	0.716 98

* Atomic mass given in unified atomic mass units, u.

Half-life of radioactive isotope

Less than 1 second
Between 1 second and 1 hour
Greater than 1 hour



Important applications of stable and/or radioactive isotopes

Isotopes in planetary science

1. High-precision barium isotope measurements yielded differences of up to 25 parts per million in the ¹³⁷Ba/¹³⁶Ba ratio and 60 parts per million in the ¹³⁸Ba/¹³⁶Ba ratio between chondrites and Earth. These differences probably arose from incomplete mixing of nucleosynthetic material in the solar nebula. Barium isotopes are also possible decay products from presently extinct ¹³⁵Cs which is thought to be a nucleosynthetic component. Chondritic meteorites have a slight excess of supernova-derived material as compared to Earth, demonstrating that the solar nebula was not perfectly homogenized upon formation.

2. ^{138}Ba has been used in studying so-called r- and s-processes in stars.

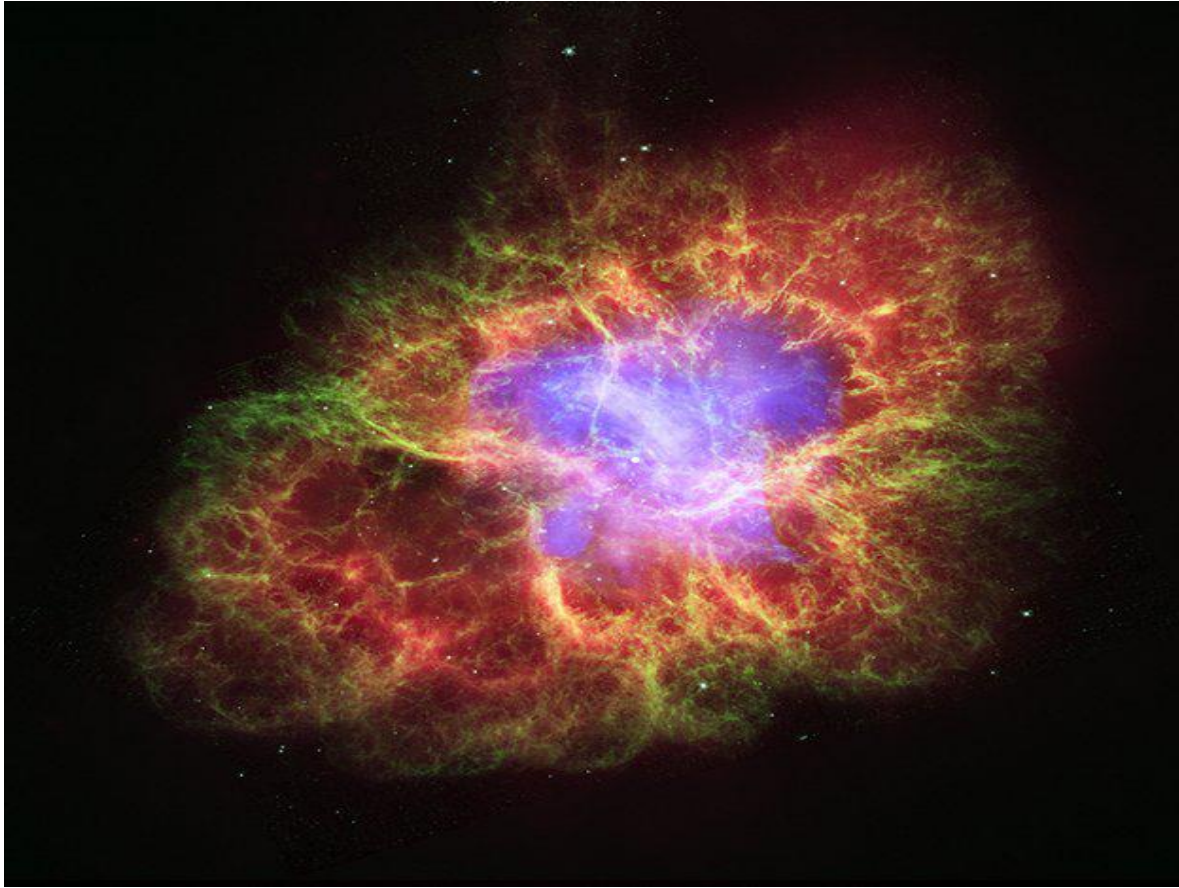


Figure 1: The crab nebula seen above is an example of an exploding star which is responsible for the release of heavy elements in to space and thought to be how planets are developed.

Isotopes in medicine

1. ^{130}Ba is used in the production of $^{131}\text{Ba}/^{131}\text{Cs}$ which is used in brachytherapy (seeds).

Isotopes in physics

1. ^{132}Ba can be used for the production of ^{133}Ba which is used as a gamma reference source.
2. ^{136}Ba has been used to study photon scattering phenomena.
3. ^{136}Ba and ^{138}Ba have been used in activation cross section experiments.